

DCB(C)2-8 for imc CRONOS-SL/compact

8-channel bridge measurement amplifier for multi-channel, dynamic strain gauge applications

The **DCB(C)2-8** is a DC bridge amplifier. With 8 differential analog inputs, it allows the measurement of:

- Voltage and current (20 mA)
- Strain gauges, bridge sensors
- IEPE/ICP sensors (with optional DSUB terminal connector)

For powering external sensors or bridge measurements, a software selectable sensor supply is integrated



CRC/DCB2-8

Highlights

- Medium signal bandwidth of up to 5 kHz
- Sensor supply with adjustable voltage supply
- Software selectable quarter-bridge completion between 120 and 350 Ω
- Graphical configuration wizard to set strain gauge bridges
- Supports imc Plug & Measure (Transducer Electronic Data Sheets (IEEE 1451))
- Also available with compact, high-density DSUB terminal connections (variant "C")

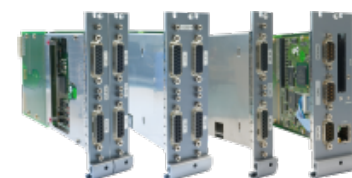
Typical applications: strain gauge measurements, load cells, pressure sensors, universal voltage measurements with higher bandwidths

imc CRONOScompact - modular measurement system

imc CRONOScompact is a modular and reconfigurable hardware a "rack"-based series of devices available in a variety of housing sizes and device frames. imc CRONOScompact (CRC) plug-in-modules can be inserted into the system (CRC-400 / CRC-2000G).

Once the modules are plugged into a portable or rack-based housing, they are electrically connected to the CRC-system and are supplied by the system with power. The data storage will be managed by the CRC-system.

Rack-based modules ("-R") differ from the standard modules only in terms of the front panel's attachment mechanism.



imc CRONOScompact plug-in-modules



imc CRONOScompact portable housing

Overview of the available variants

Standard version		ET Version *	
Order Code:	article no.	article no.	Remarks
CRC/DCB2-8	11700018	11710017	for imc CRONOScompact
CRC/DCB2-8-R	11700108	11710067	for imc CRONOScompact RACK
CRC/DCBC2-8	11700076		variant with DSUB-26 sockets
CRC/DCBC2-8-R	11700144		for imc CRONOScompact RACK

Standard version		ET Version *	
Order Code:	article no.	article no.	Remarks
CRSL/DCB2-8-D		11800077	CRONOS-SL variant with DSUB-15
CRSL/DCB2-8-L		11800078	CRONOS-SL variant with LEMO sockets

* ET: Version in extended temperature range

Included accessories

- Calibration certificate with test equipment verification as per ISO 9001 (manufacturer's calibration certificate, PDF)
- Getting started with imc CRONOScompact (CRC) respectively CRONOS-SL (one copy per delivery)

Variant with DSUB-15 sockets		article no.
• 4x ACC/DSUBM-B2	DSUB-15 plug with screw terminals for 2-channel measurement of strain gauges, bridges and voltage	13500170
Variant with DSUB-26-HD sockets		
• 2x ACC/DSUBM-HD-B4	DSUB-26 plug with screw terminals for 4-channel measurement of strain gauges, bridges and voltage	13500197

Optional accessories

DSUB-15 plugs

• ACC/DSUBM-B2-IP65	sealed version, suitable for SL series	13500218
• ACC/DSUBM-TEDS-B2	version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure	13500191
• ACC/DSUBM-TEDS-B2-IP65	sealed TEDS version	13500331
• ACC/DSUBM-I2	DSUB-15 plug with screw terminals for 2-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02A/V)	13500180
• ACC/DSUBM-I2-IP65	sealed version, suitable for SL series	13500329
• ACC/DSUBM-TEDS-I2	version with TEDS support, according to IEEE 1451 for use with imc Plug & Measure	13500193
• ACC/DSUBM-TEDS-I2-IP65	sealed TEDS version	13500334
• ACC/DSUBM-ICP2I-BNC-S	DSUB-15 plug for 2 IEPE/ICP sensors, BNC connection, isolated, slow	13500293
• ACC/DSUBM-ICP2I-BNC-F	DSUB-15 plug for 2 IEPE/ICP sensors, BNC connection, isolated, fast	13500294

LEMO plug

• ACC/TH-LEM-150	LEMO.1B plug for thermocouple measurement with built-in cold-junction compensation (CJC) via PT100	13500086
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High-Density (HD) plug

• ACC/DSUBM-HD-I4	DSUB-26 plug with screw terminals for 4-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02 A/V)	13500195
• ACC/DSUBM-HD-B4	DSUB-26 plug with screw terminals for 4-channel bridge measurement	13500197

Mounting brackets for fixed installations of imc CRONOS*compact* devices (CRC)

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|--------------------|-------------------------------|----------|
| • CRC/BRACKET-CON | mounting bracket 90° | 11700153 |
| • CRC/BRACKET-90 | mounting bracket for DIN-Rail | 11700152 |
| • CRC/BRACKET-BACK | mounting bracket for DIN-Rail | 11700154 |

Mounting brackets for fixed installations of imc CRONOS-SL devices (CRSL)

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|-------------------|--|----------|
| • CRSL/BRACKET-90 | mounting bracket 90°, mounting on a flat surface | 11800080 |
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Miscellaneous

- Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used (PDF). Meets requirements of DIN EN ISO 17025

Technical Specs - CRC/CRSL/DCB(C)2-8

Parameter	Value	Remarks
Inputs	8	
Measurement modes DSUB-15	voltage measurement current measurement bridge sensor strain gauges current-fed sensors (IEPE/ICP)	shunt-plug ACC/DSUBM-I2(-IP65) or single end (internal shunt) full, half, quarter bridge with DSUB-15 expansion plug: e.g. ACC/DSUBM-ICP21-BNC-S/-F, isolated
Measurement modes DSUB-26-HD	voltage measurement current measurement bridge sensor strain gauges	ACC/DSUBM-HD-I4 shunt-plug or Single-ended (internal shunt) full, half, quarter bridge
Measurement modes LEMO	voltage measurement bridge sensor strain gauges current measurement	full, half, quarter bridge Single-ended (internal shunt)
Terminal connection DSUB-15 DSUB-26-HD LEMO	4x DSUB-15 2x DSUB-26-HD 8x LEMO.1B.307	2 channels per plug 4 channels per plug 1 channel per plug

Sampling rate, Bandwidth, Filter, TEDS

Parameter	Value	Remarks
Sampling rate	≤ 100 kHz	per channel
Bandwidth	0 Hz to 5 kHz	-3 dB
Filter (digital) cut-off frequency characteristic order	1 Hz to 2 kHz	Butterworth, Bessel (digital) low pass or high pass filter 8th order band pass, LP 4th and HP 4th order Anti-aliasing filter: Cauer 8.order with $f_{\text{cutoff}} = 0.4 f_s$
Resolution	16 Bit	internal processing 24 Bit
TEDS only with DSUB-15	conforming IEEE 1451.4 Class II MMI	esp. with ACC/DSUBM-TEDS-xx (DS2433) not supported: DS2431 (typ. IEPE/ICP sensor)

General			
Parameter	Value typ.	min. / max.	Remarks
Overvoltage protection		±40 V	permanent
Input coupling	DC		
Input configuration	differential		
Input impedance	20 MΩ	±1%	
Auxiliary supply			only with DSUB-15 variant for IEPE/ICP expansion plug
voltage	+5 V	±5%	independent of integrated
available current	0.26 A	0.2 A	sensor supply, short-circuit protected
internal resistance	1.0 Ω	<1.2 Ω	power per DSUB-plug

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input range	±10 V, ±5 V, ±2.5 V, ±1 V... ±5 mV		
Gain error	0.02%	0.05%	of the measured value, at 25°C
Gain drift	10 ppm/K·ΔT _a	30 ppm/K·ΔT _a	ΔT _a = T _a -25°C ; ambient temperature T _a
Offset error	0.02%	≤0.05% ≤0.06% ≤0.15%	of the input range at 25°C range >±50 mV range ≤±50 mV range ≤±10 mV
Offset drift	±0.7 μV/K·ΔT _a ±0.1 μV/K·ΔT _a	±6 μV/K·ΔT _a ±1.1 μV/K·ΔT _a	range ±10 V to ±0.25 V range ≤±0.1 V ΔT _a = T _a -25°C ; ambient temperature T _a
Nonlinearity	10 ppm	50 ppm	
CMRR (common mode rejection ratio)	110 dB 138 dB	>90 dB >132 dB	DC and f≤60 Hz range ±10 V to ±50 mV range ±25 mV to ±5 mV
Noise (RTI)	0.6 μV _{RMS} 0.14 μV _{RMS}	1.0 μV _{RMS} 0.26 μV _{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with shunt plug			
Parameter	Value typ.	min. / max	Remarks
Input range	±50 mA, ±20 mA, ±10 mA, ±5 mA, ±2 mA, ±1 mA		
Shunt impedance	50 Ω		external plug ACC/DSUBM-I2
Over load protection		±60 mA	permanent
Input configuration	differential		
Gain error	0.02%	0.06% 0.1%	of reading, at 25°C plus error of 50 Ω shunt
Gain drift	15 ppm/K·ΔT _a	55 ppm/K·ΔT _a	ΔT _a = T _a -25°C ambient temperature T _a
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA _{RMS} 0.15 nA _{RMS}	10 nA _{RMS} 0.25 nA _{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Current measurement with internal shunt			
Parameter	Value typ.	min. / max	Remarks
Input range	$\pm 50 \text{ mA}$, $\pm 20 \text{ mA}$, $\pm 10 \text{ mA}$, $\pm 5 \text{ mA}$, $\pm 2 \text{ mA}$, $\pm 1 \text{ mA}$		
Shunt impedance	120 Ω		internal
Over load protection		$\pm 60 \text{ mA}$	permanent
Input configuration	Single-ended		internal current backflow to -VB
Gain error	0.02%	0.06%	of reading, at 25°C
Gain drift	15 ppm/K· ΔT_a	55 ppm/K· ΔT_a	$\Delta T_a = T_a - 25^\circ\text{C} $ ambient temperature T_a
Offset error	0.02%	0.05%	of range, at 25°C
Noise (current)	0.6 nA _{RMS} 0.15 nA _{RMS}	10 nA _{RMS} 0.25 nA _{RMS}	bandwidth 0.1 Hz to 1 kHz bandwidth 0.1 Hz to 10 Hz

Bridge measurement			
Parameter	Value typ.	min. / max.	Remarks
Mode	DC		
Measurement modes	full-, half-, quarter bridge		bridge supply $\leq 5 \text{ V}$ with quarter bridge
Input ranges	$\pm 1000 \text{ mV/V}$, $\pm 500 \text{ mV/V}$, $\pm 200 \text{ mV/V}$, $\pm 100 \text{ mV/V}$... bridge supply: 10 V ... $\pm 0.5 \text{ mV/V}$ bridge supply: 5 V ... $\pm 1 \text{ mV/V}$ bridge supply: 2.5 V ... $\pm 2 \text{ mV/V}$ bridge supply: 1 V ... $\pm 5 \text{ mV/V}$		(as an option) (as an option)
Bridge excitation voltage (as an option)	10 V 5 V (2.5 V and 1 V)	$\pm 0.5\%$ $\pm 0.5\%$	The actual value will be dynamically captured and compensated for in bridge mode.
Min. bridge impedance	120 Ω , 10 mH full bridge 60 Ω , 10 mH half bridge		
Max. bridge impedance	5 k Ω		
Internal quarter bridge completion	120 Ω , 350 Ω		internal, switchable per software
Input impedance	20 M Ω	$\pm 1 \%$	differential, full bridge
Gain error	0.02%	0.05%	of reading
Offset error	0.01%	0.02%	of input range after automatic bridge balancing
automatic shunt calibration	0.5 mV/V	$\pm 0.2\%$	for 120 Ω and 350 Ω
Cable resistance for bridges (without return line)	<6 Ω <12 Ω		10 V excitation 120 Ω 5 V excitation 120 Ω

Sensor supply				
Parameter	Value typ.		max.	Remarks
Configuration options	5 selectable settings			The sensor supply module always has 5 selectable voltage settings. default selection: +5 V to +24 V
Output voltage	Voltage (+1 V) (+2.5 V) +5.0 V +10 V +12 V +15 V +24 V (±15 V)	Current 580 mA 580 mA 580 mA 300 mA 250 mA 200 mA 120 mA 190 mA	Power 0.6 W 1.5 W 2.9 W 3.0 W 3.0 W 3.0 W 2.9 W 3.0 W	set jointly for all eight channels upon request, also 2.5 V and 1 V settings are available, for example by replacing the +12 V or +15 V setting. An arbitrary set of 5 setting can be chosen preferred selections: +24 V, +12 V, +10 V, +5.0 V, +2.5 V +15 V, +10 V, +5.0 V, +2.5 V, +1 V upon request, special order: +15 V can be replaced by ±15 V. This eliminates the internal current- and quarter bridge measurement.
Isolation	non isolated			output to case (CHASSIS)
Short-circuit protection	unlimited duration			to output voltage reference ground: "-VB"
Accuracy of output voltage	<0.25 % 0.5 % 0.9 % 1.5 %			at terminals, no load at 25 °C over entire temperature range plus with optional bipolar output voltage
Compensation of cable resistances	3-line control: SENSE line as refeed (-VB: supply ground)			calculated compensation with bridges
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V